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EXAMINER	
SINGH, DALZID E	
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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/008,463	Applicant(s) NEFF ET AL.
	Examiner Dalzid Singh	Art Unit 2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 21 July 2005.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27,29-37 and 39-41 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-27,29-37 and 39-41 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 21 July 2005 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of claims 38 and 39 is withdrawn in view of the newly discovered reference(s). Rejections based on the newly cited reference(s) follow.

Claim Objections

2. Claim 31 is objected to because of the following informalities: claim 31 is depending on a cancelled claim (claim 28). Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-5, 8-18, 21-34 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doucet et al (US Patent No. 6,348,986) in view of Puzey et al (US Patent No. 6,584,245).

Regarding claim 1, Doucet et al disclose method for free space communication, as shown in Fig. 6A, comprising the steps of:

generating an optical beam having a diameter (transmitting unit (900) generates optical beam (950) having a diameter; see col. 12, lines 47-62);

transmitting the optical beam over a free space link to impinge on a plurality of receive objectives (1060A to 1060N), wherein the diameter of the optical beam at initial transmission is greater than a sum of diameters of each of the plurality of receive objectives and spacing between the plurality receive objectives such that the optical beam overfills the plurality of receivers objectives (as shown in Fig. 6A, the diameter of the optical beam transmitted by transmitting means is greater than the sum of diameters of each of the plurality of receive objectives and spacing between the plurality receiver objectives; Fig. 6B shows plurality of receivers shown by "X", wherein diameter of optical beam, shown by circle, overfills the plurality of receivers);

directing through each of the plurality of receive objectives a portion of the optical beam that impinges on each of the plurality of receive objectives directly into a respective receiver fiber optic core (1050A to 1050N); and,

Doucet et al disclose receiving first light beams and transmit a second light beam (see col. 17, lines 22-52) and differ from the claimed invention in that Doucet et al do not specifically disclose optically transforming the transmitted optical beam to a second wavelength with a wavelength transformer. However, it is well known to convert wavelength using wavelength transformer or converter. Puzey is cited to show such well known concept. In col. 11, lines 30-39, Puzey teach the use of wavelength converter in free space communication system. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide wavelength converter or transformer to the communication system of Doucet et al as

taught by Puzey. One of ordinary skill in the art would have been motivated to do such in order to provide suitable wavelength for transmission.

Regarding claims 2 and 26, as discussed above, Doucet et al show transmission of optical beam and in Fig. 19, Doucet et al show detail view of transceiver unit which comprise of optical antenna (3210) and beam adjuster (3220) control by controller (3350). In col. 24, lines 47-57, Doucet et al disclose collimating the optical beam and limiting the divergence of the optical beam, which is performed by adjusting beam diameter. Doucet et al differ from the claimed invention in that Doucet et al do not specifically disclose that the optical beam is substantially non-divergent and has a diameter at transmission of at least 0.1 meters. However, Doucet et al clearly suggest that the optical beam is adjustable. Based on this teaching, it would have been obvious to an artisan at the time of the invention to adjust the diameter of the optical beam to be within the predetermined value such 0.1 meters. Furthermore, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Swain et al.*, 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Minning and Mfg. Co. v. Coe, 69 App D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App D.C. 324, 135 F.2d 11, 57 USPQ 136. In addition, discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Antonie*, 559 F.2d 239, 618, 195 USPQ 6 (CCPA 1977); *In re Aller,* 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955). See also *In re Aller,* 105 USPQ 233 (CCPA 1955) and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore, it would have been

obvious to adjust the diameter of the optical beam to an optimum or workable value or range by routine experimentation.

Regarding claims 3 and 18, as discussed above, it would have been obvious to an artisan at the time of the invention to adjust the diameter of the optical beam to be within the predetermined value such 0.1 meters.

Regarding claims 4 and 21, as shown in Fig. 6C, Doucet et al show the step of combining the portions of optical beam from each of the respective receiver fiber optic cores into a single optical signal (FCI (1020) combines the portions of optical beam from each of the respective receiver fiber optic cores (1050A to 1050N) into a single optical signal, which is transmitted on fiber (1018); see col. 12, lines 64-67 to col. 13, lines 1-3).

Regarding claim 5, as shown in Fig. 6C, Doucet et al show the steps of transmitting the optical beam, directing the portion of the optical beam and combining the portions of the optical beam all optically and without electro-optical conversion.

Regarding claim 8, as discussed above, it would have been obvious to an artisan at the time of the invention to adjust the diameter of the optical beam to be within the predetermined value such equal to or greater than 0.1 meters.

Regarding claim 9, as shown in Fig. 6A, Doucet et al show that the optical communication system comprising of plurality of receive objectives (1060A to 1060N) and differ from the claimed invention in that Doucet et al do not specifically disclose the parameters of each of the plurality of receive objectives are between 5 and 100 millimeters. However, it would have been a matter of design choice to an artisan of ordinary skill in the art at the time the invention was made to provide of receive

objectives having parameter between 5 and 100 millimeters. One of ordinary skill in the art would have been motivated to do such in order to provide plurality of receive objectives at one location in order to provide greater precision.

Regarding claim 10, as shown in Fig. 6A, Doucet et al show the step of generating the optical beam including generating a plurality of decorrelated optical paths.

Regarding claim 11, as shown in Fig. 6A, Doucet et al show the step of providing low angular diversity; and providing high spatial diversity.

Regarding claim 12, Doucet et al disclose the steps of receiving an initial optical signal having a first wavelength (first beam); converting the wavelength of the initial signal (demodulate first data signal) to a second wavelength (second beam) prior to the step of generating the optical beam; and the step of generating the optical beam including generating the optical beam from the initial signal having the second wavelength (see col. 16, lines 16-22).

Regarding claims 13, Doucet et al disclose the step of combining the portions of optical beam from each of the respective receiver fiber optic cores into a single optical signal (see Fig. 6C, Doucet et al show combining means (1020) for combining the portions of optical beam from each of the respective receiver fiber optic cores (1060A to 1060N) into a single optical signal (1018)), wherein the single optical signal has a wavelength equal to the second wavelength; and converting the wavelength of the single optical signal to a third wavelength (see col. 17, lines 22-52, Doucet et al disclose converting wavelengths).

Regarding claim 14, as discussed above, Doucet et al disclose performing the steps of receiving the optical beam, converting the first wavelength, transmitting the optical beam, and directing the portion of the optical beam all optically.

Regarding claim 15, Doucet et al disclose receiving an initial optical signal (as shown in Fig. 19); optically adjusting the power of the initial optical signal (see col. 33, lines 12-19; Doucet et al disclose that diameter of the beam corresponds to power of the beam; diameter of the beam can be adjusted by optics shown in Fig. 19, therefore power of the beam ca be adjusted accordingly); and the step of generating the optical beam including generating the optical beam from the adjusted optical signal (Fig. 19 shows optical beam is generated by the system).

Regarding claim 16, as discussed above, Doucet et al disclose the step of combining the portions of optical beam from each of the respective receiver fiber optic cores into a single optical signal (see Fig. 6C); and performing the step of optically adjusting the power of the optical beam if the power of the optical signal is less than a threshold level (the optics in Fig. 19, can adjust power of the beam; see rejection of claim 15). Doucet et al differ from the claimed invention in that Doucet et al do not specifically disclose monitoring the power of the single optical signal. However, since Doucet et al show controller (3350) for controlling the optics as shown in Fig. 19, therefore it would have been obvious that the optical beam is monitored in order to be controlled.

Regarding claim 17, Doucet et al disclose method for free space communication, as shown in Fig. 6A, comprising the steps of:

generating an optical beam having a diameter (transmitting unit (900) generates optical beam (950) having a diameter; see col. 12, lines 47-62);

transmitting the optical beam over a free space link to impinge on a plurality of receive objectives (1060A to 1060N), wherein the diameter of the optical beam at initial transmission is greater than a sum of diameters of each of the plurality of receive objectives and spacing between the plurality receive objectives such that the optical beam overfills the plurality of receivers objectives (as shown in Fig. 6A, the diameter of the optical beam transmitted by transmitting means is greater than the sum of diameters of each of the plurality of receive objectives and spacing between the plurality receiver objectives; Fig. 6B shows plurality of receivers shown by "X", wherein diameter of optical beam, shown by circle, overfills the plurality of receivers); and

directing through each of the plurality of receive objectives a portion of the optical beam that impinges on each of the plurality of receive objectives directly into a respective receiver fiber optic core (1050A to 1050N).

Doucet et al show transmission of optical beam and in Fig. 19, Doucet et al show detail view of transceiver unit which comprise of optical antenna (3210) and beam adjuster (3220) control by controller (3350). In col. 24, lines 47-57, Doucet et al disclose collimating the optical beam and limiting the divergence of the optical beam, which is performed by adjusting beam diameter. Doucet et al differ from the claimed invention in that Doucet et al do not specifically disclose that the optical beam is substantially non-divergent and has a diameter at transmission of at least 0.1 meters. However, Doucet et al clearly suggest that the optical beam is adjustable. Based on

this teaching, it would have been obvious to an artisan at the time of the invention to adjust the diameter of the optical beam to be within the predetermined value such 0.1 meters. Furthermore, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Swain et al.*, 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Minning and Mfg. Co. v. Coe, 69 App D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App D.C. 324, 135 F.2d 11, 57 USPQ 136. In addition, discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Antonie*, 559 F.2d 239, 618, 195 USPQ 6 (CCPA 1977); *In re Aller,* 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955). See also *In re Aller,* 105 USPQ 233 (CCPA 1955) and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to adjust the diameter of the optical beam to an optimum or workable value or range by routine experimentation.

Furthermore, Doucet et al disclose receiving first light beams and transmit a second light beam (see col. 17, lines 22-52) and differ from the claimed invention in that Doucet et al do not specifically disclose optically transforming the transmitted optical beam to a second wavelength with a wavelength transformer. However, it is well known to convert wavelength using wavelength transformer or converter. Puzey is cited to show such well known concept. In col. 11, lines 30-39, Puzey teach the use of wavelength converter in free space communication system. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made

to provide wavelength converter or transformer to the communication system of Doucet et al as taught by Puzey. One of ordinary skill in the art would have been motivated to do such in order to provide suitable wavelength for transmission.

Regarding claim 22, Doucet et al disclose the step of optically coupling the single optical signal into a fiber optic link of a terrestrial optical communication network (see col. 32, lines 30-49).

Regarding claim 23, Doucet et al disclose free space communication, as shown in Fig. 6A, comprising:

a transmit objective (900) being configured to optically transmit a collimated optical signal having a low divergence across a free space link;

the transmit objective being optically aligned across the free space link with a plurality of receive objectives that are sized and configured such that the plurality of receive objectives are overfilled by the transmitted optical signal (transmitting unit (900) generates optical beam (950) having a diameter; see col. 12, lines 47-62);

each of the plurality of receive objectives being optically coupled with a respective fiber optic core, wherein the plurality of receive objectives are further configured to optically direct a portion of the transmitted optical signal directly into its respective fiber optic core (1050A to 1050N); and

each of the respective fiber optic cores being optically coupled with an optical combiner configured to combined the optical signal from each of the fiber optics to generate a single optical signal (see Fig. 6C, Doucet et al show combining means

(1020) for combining the portions of optical beam from each of the respective receiver fiber optic cores (1060A to 1060N) into a single optical signal (1018)).

Doucet et al disclose receiving first light beams and transmit a second light beam (see col. 17, lines 22-52) and differ from the claimed invention in that Doucet et al do not specifically disclose optically transforming the transmitted optical beam to a second wavelength with a wavelength transformer. However, it is well known to convert wavelength using wavelength transformer or converter. Puzey is cited to show such well known concept. In col. 11, lines 30-39, Puzey teach the use of wavelength converter in free space communication system. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide wavelength converter or transformer to the communication system of Doucet et al as taught by Puzey. One of ordinary skill in the art would have been motivated to do such in order to provide suitable wavelength for transmission.

Regarding claim 24, as discussed above, Doucet et al show transmission of optical beam and in Fig. 19, Doucet et al show detail view of transceiver unit which comprise of optical antenna (3210) and beam adjuster (3220) control by controller (3350). In col. 24, lines 47-57, Doucet et al disclose collimating the optical beam and limiting the divergence of the optical beam, which is performed by adjusting beam diameter. Doucet et al differ from the claimed invention in that Doucet et al do not specifically disclose that the transmit objective being configured to optically transmit the collimated optical signal having a divergence of less than 1.5 mr across the free space link. However, Doucet et al clearly suggest that the optical beam is adjustable. Based

on this teaching, it would have been obvious to an artisan at the time of the invention to adjust the diameter of the optical beam to be less than 1.5. Furthermore, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Swain et al.*, 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Minning and Mfg. Co. v. Coe, 69 App D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App D.C. 324, 135 F.2d 11, 57 USPQ 136. In addition, discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Antonie*, 559 F.2d 239, 618, 195 USPQ 6 (CCPA 1977); *In re Aller,* 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955). See also *In re Aller,* 105 USPQ 233 (CCPA 1955) and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to adjust the diameter of the optical beam to an optimum or workable value or range by routine experimentation.

Regarding claims 25 and 32, as shown in Fig. 6A, Doucet et al show that the optical communication system comprising of plurality of receive objectives (1060A to 1060N) and differ from the claimed invention in that Doucet et al do not specifically disclose each of the receive objectives have an effective focal length of less than 300 mm. However, it would have been a matter of design choice to an artisan of ordinary skill in the art at the time the invention was made to provide the receive objectives having focal length of less than 300 mm. One of ordinary skill in the art would have been motivated to do such in order to provide plurality of receive objectives at one location in order to provide greater precision.

Regarding claim 27, as shown in Fig. 6A, Doucet et al show that the transmitted optical signal and differ from the claimed invention in that Doucet et al do not specifically disclose that the transmitted optical signal is configured to have a substantially constant diameter across the free space link. However, since diameter of optical signal increased as the distance from source to destination is increased, therefore, it would have been obvious to an artisan of ordinary skill in the art to vary the distance between transmitting source and receiving destination such that diameter of the optical signal received by the destination receiver will be substantially constant across the free space link.

Regarding claim 29, in Fig. 11, Doucet et al show a plurality of transmit optical fibers (1450-1 to 1450N) being optically coupled with the transmit objective (1460-1 to 1460-N), wherein each of the plurality of transmit optical fibers being configured to direct an initial optical signal at the transmit objective such that the transmitted optical signal is based on at least one of the initial optical signals (it would have been obvious that the transmitted optical signal is based on at least one of the initial optical signals).

Regarding claim 30, Doucet et al disclose free space communication, as shown in Fig. 16A, comprising:

a first transceiver (3120) comprising a transmit objective configured to transmit a first optical signal over free space (as shown in Fig. 16, Doucet et al show plurality of transceivers); and

a second transceiver (transceiver within the optical router can be considered as a second transceiver; Fig. 6A shows receiver system of the transceiver unit) comprising:

a) a plurality of receive objectives (1060A to 1060N) configured to receive the first optical signal (950), wherein the first optical signal has a diameter large enough to overfill at least two receive objectives (see col. 12, lines 47-62);

b) each of the plurality of receive objectives being optically coupled with a respective fiber optic conductor (1050A to 1050N), wherein the receive objectives being configured to focus a portion of the first optical signal impinging on the receive objective into the respective fiber optic conductor; and

c) a second optical signal combiner (1020), shown in Fig. 6C, coupled with the respective fiber optic conductors, the second optical signal combiner being configured to combine the portions of the first optical signal from the respective fiber optic conductors into a first single received optical signal.

Doucet et al show transmission of optical beam and in Fig. 19, Doucet et al show detail view of transceiver unit which comprise of optical antenna (3210) and beam adjuster (3220) control by controller (3350). In col. 24, lines 47-57, Doucet et al disclose collimating the optical beam and limiting the divergence of the optical beam, which is performed by adjusting beam diameter. Doucet et al differ from the claimed invention in that Doucet et al do not specifically disclose that the transmit objective being configured to optically transmit the first optical signal having a diameter of at least 10cm. However, Doucet et al clearly suggest that the optical beam is adjustable. Based on this teaching, it would have been obvious to an artisan at the time of the invention to adjust the diameter of the optical beam to be less than 10cm. Furthermore, where the general conditions of a claim are disclosed in the prior art, it is not inventive

to discover the optimum or workable ranges by routine experimentation. *In re Swain et al.*, 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Minning and Mfg. Co. v. Coe, 69 App D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App D.C. 324, 135 F.2d 11, 57 USPQ 136. In addition, discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Antonie*, 559 F.2d 239, 618, 195 USPQ 6 (CCPA 1977); *In re Aller,* 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955). See also *In re Aller,* 105 USPQ 233 (CCPA 1955) and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to adjust the diameter of the optical beam to an optimum or workable value or range by routine experimentation.

Furthermore, Doucet et al disclose receiving first light beams and transmit a second light beam (see col. 17, lines 22-52) and differ from the claimed invention in that Doucet et al do not specifically disclose optically transforming the transmitted optical beam to a second wavelength with a wavelength transformer. However, it is well known to convert wavelength using wavelength transformer or converter. Puzey is cited to show such well known concept. In col. 11, lines 30-39, Puzey teach the use of wavelength converter in free space communication system. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide wavelength converter or transformer to the communication system of Doucet et al as taught by Puzey. One of ordinary skill in the art would have been motivated to do such in order to provide suitable wavelength for transmission.

Regarding claim 31, as discussed above, Doucet et al show transmission of optical beam and in Fig. 19, Doucet et al show detail view of transceiver unit which comprise of optical antenna (3210) and beam adjuster (3220) control by controller (3350). In col. 24, lines 47-57, Doucet et al disclose collimating the optical beam and limiting the divergence of the optical beam, which is performed by adjusting beam diameter. Doucet et al differ from the claimed invention in that Doucet et al do not specifically disclose that the transmit objective being configured to optically transmit the first optical signal having a divergence of less than 1.0. However, Doucet et al clearly suggest that the optical beam is adjustable. Based on this teaching, it would have been obvious to an artisan at the time of the invention to adjust the divergence of the optical beam to be less than 1.0. Furthermore, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Swain et al.*, 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Minning and Mfg. Co. v. Coe, 69 App D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App D.C. 324, 135 F.2d 11, 57 USPQ 136. In addition, discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Antonie*, 559 F.2d 239, 618, 195 USPQ 6 (CCPA 1977); *In re Aller,* 42 CCPA 824, 220 F.2d 454, 105 USPQ 233 (1955). See also *In re Aller,* 105 USPQ 233 (CCPA 1955) and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to adjust the diameter of the optical beam to an optimum or workable value or range by routine experimentation.

Regarding claim 33, as shown in Fig. 6A, Doucet et al show that the first optical signal (950) is configured to overfill all of the plurality of receive objectives (1060A to 1060N).

Regarding claim 34, Doucet et al disclose free space communication, as shown in Fig. 16A, comprising:

a second transceiver comprising a transmit objective configured to transmit a first optical signal over free space (as shown in Fig. 16, Doucet et al show plurality of transceivers); and

a first transceiver (transceiver communicating with the optical router can be considered as a first transceiver; Fig. 6A shows receiver system of the transceiver unit) comprising:

a) a plurality of receive objectives (1060A to 1060N) configured to receive the second optical signal, wherein the second optical has a diameter large enough to overfill at least two receive objectives of the first transceiver(see col. 12, lines 47-62);

b) each of the plurality of receive objectives of the first transceiver being optically coupled with a respective fiber optic conductor (1050A to 1050N), wherein the receive objectives of the first transceiver being configured to focus a portion of the second optical signal impinging on the receive objective into the respective fiber optic conductor; and

c) the respective fiber optic conductors being coupled with a first optical signal combiner (1020), shown in Fig. 6C, configured to combine the portions of the second

optical signal from the respective fiber optic conductors into a second single received optical signal.

5. Claims 35-37, 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doucet et al (US Patent No. 6,348,986) in view of Puzey et al (US Patent No. 6,584,245) and further in view of Arnold et al (US Patent No. 6,347,001).

Regarding claim 35, as discussed above, the combination of Doucet et al and Puzey discloses free space communication system comprising of plurality of transceiver and differ from the claimed invention in that the combination does not specifically disclose a second beacon configured to receive the first optical signal; and the second beacon being coupled with a power controller configured to determine a power of the first optical signal and to adjust a power level of the second optical signal based on the power of the first optical signal. However, it is well known in free space optical communication system to transmit a beacon beam. Arnold et al is cited to show such well known concept. In col. 8, lines 9-27 and lines 50-60, Arnold et al teach transmission of beacon signal. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide beacon beam. One of ordinary skill in the art would have been motivated to do such in order to align and monitor power level of the signal.

Regarding claim 36, as discussed above, the combination of Doucet et al and Puzey discloses free space communication system comprising of plurality of transceiver and differ from the claimed invention in that the combination does not specifically

disclose a second beacon configured to receive the first optical signal and to sense the position of the first transceiver; and the second beacon being coupled with a second controller configured to receive position information from the beacon and to maintain optical alignment between the first and second transceivers based on the position information. However, it is well known in free space optical communication system to transmit a beacon beam. Arnold et al is cited to show such well known concept. In col. 8, lines 9-27 and lines 50-60, Arnold et al teach transmission of beacon beam. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide beacon beam. One of ordinary skill in the art would have been motivated to do such in order to align and monitor power level of the signal.

Regarding claim 37, as discussed above, the combination of Doucet et al, Puzey and Arnold et al disclose the transmission of beacon beam for tracking signal over the free space; the second transceiver further comprising a second beacon configured to receive the tracking signal and to sense the position of the first transceiver based on the received tracking signal; and the second beacon being coupled with a second controller configured to receive position information from the second beacon and to maintain optical alignment between the first and second transceivers based on the position information (as discussed above, the controller received the beacon beam and adjust alignment and power of the transceivers).

Regarding claim 39, in Fig. 6A and 6C Doucet et al disclose optical conductor coupled to the transceiver and Doucet et al disclose receiving one light beams and transmit another light beam (see col. 17, lines 22-52) and differ from the claimed

invention in that Doucet et al do not specifically disclose optically transforming the transmitted optical beam to a second wavelength with a wavelength transformer. However, it is well known to convert wavelength using wavelength transformer or converter. Puzey is cited to show such well known concept. In col. 11, lines 30-39, Puzey teach the use of wavelength converter in free space communication system. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide wavelength converter or transformer to the communication system of Doucet et al as taught by Puzey. One of ordinary skill in the art would have been motivated to do such in order to provide suitable wavelength for transmission. Furthermore, since the optical signal

Regarding claim 40, as discussed above, the combination of Doucet et al, Puzey and Arnold et al disclose beacon configured to receive the first optical signal; and the second beacon being coupled with a power controller configured to determine a power of the first optical signal and to signal the first transceiver to adjust the power level of the first optical signal (as discussed above, the controller received the beacon beam and adjust alignment and power of the transceivers).

Regarding claim 41, Doucet et al disclose that the second transceiver being coupled with a terrestrial optical communication network, wherein the second transceiver optically couples the first single received optical signal into a fiber optic link of the terrestrial optical communication network (see col. 32, lines 30-49).

6. Claims 6, 7, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doucet et al (US Patent No. 6,348,986) in view of Puzey et al (US Patent No. 6,584,245) and further in view of Medved et al (US Patent no. 6,671,436).

Regarding claims 6 and 19, the combination of Doucet et al and Puzey discloses the use of optical fiber optical cores coupled to the respective receiver as discussed above and differ from the claimed invention in that the combination does not specifically disclose that the fiber optic cores is a single mode fiber optic. However, the use of single mode fiber is well know in optical communication system. Medved et al is cited to show such well known concept. In col. 5, lines 34-36 and lines 49-51, Medved et al disclose the use of single mode fiber. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to provide a single mode fiber as taught by Medved et al to the optical system of the combination of Doucet et al and Puzey. One of ordinary skill in the art would have been motivated to do this in order to prevent mode dispersion.

Regarding claims 7 and 20, the combination of Doucet et al and Puzey discloses the use of optical fiber optical cores coupled to the respective receiver as discussed above and differ from the claimed invention in that the combination does not specifically disclose that the fiber optic cores is a multi-mode fiber optic having a core diameter less than 100 micrometers. However, the use of multi-mode fiber is well know in optical communication system. Medved et al is cited to show such well known concept. In col. 5, lines 51-53, Medved et al disclose the use of multi-mode fiber. Therefore, it would have been obvious to an artisan of ordinary skill in the art at the time

the invention was made to provide multi-mode fiber as taught by Medved et al to the optical system of the combination of Doucet et al and Puzey. Since multi-mode fiber typically has large core, therefore, one of ordinary skill in the art would have been motivated to utilize such fiber in order to provide good coupling from inexpensive LEDs and the use of inexpensive couplers and connectors.

Response to Arguments

7. Applicant's arguments with respect to claims 1 and 23 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalzid Singh whose telephone number is (571) 272-3029. The examiner can normally be reached on Mon-Fri 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272--3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DS
September 20, 2005

M. R. Sedighian
M. R. SEDIGHIAN
PRIMARY EXAMINER